A Study to Empower Pre-service Teachers with Skill Sets to Develop Technology Enhanced ODL Material

Theme: Skills Development

Sub-theme: Skills for National Development

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INTRODUCTION

Most reputed Teacher Education Institutes come with the inherent advantages of having curriculum designers, subject matter experts and a well stocked library under one roof; hence to tap their potential, pre-service teachers at such premier institutes should be trained to develop instructional material. Involving teacher education institutes in material development would also ensure that local needs of the learners are also met. Today, as education is no longer restricted only to a formal system and the ODL form of learning is gaining popularity, pre-service teachers need to be equipped with the skill sets to be able to negotiate the teaching learning in an ODL environment. Open and distance learning provides learners with more accessibility and flexibility.

TECHNOLOGY ENHANCED ODL MATERIAL DEVELOPMENT

Publications from the Commonwealth of Learning(for example: Training Educators to Design and Develop ODL Materials A Facilitator's Guide (2008) ; Creating Learning Materials for Open and Distance Learning: A Handbook for Authors and Instructional Designers (2005) and IGNOU (STRIDE Handbook 5: Development and Revision of Self-Learning Materials, 2004) have discussed in detail the various aspects of material development for ODL. Based on these standard references, the author has identified the following stages in developing Technology Enhanced ODL Material for School Subjects by Pre-service teachers. The stages help the Pre-service teachers in developing, designing and deciding aspects of Technology Enhanced ODL Material.

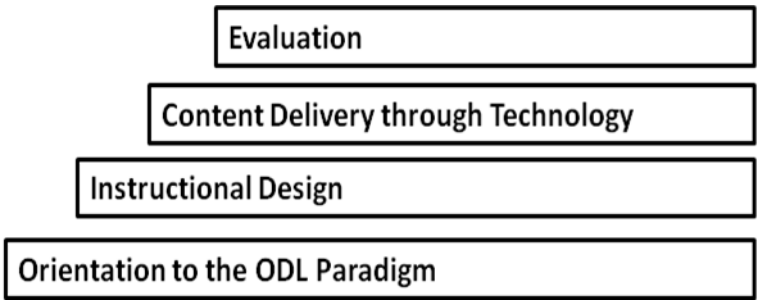

Figure 1: Stages in developing Technology Enhanced ODL Material by Pre-service Teachers

Stage 1: Orientation to the ODL Paradigm

Pre-service teachers in the Teacher Education Programs across India gain expertise in classroom transactions via the face to face medium. In this process, they are able to cater to the learning needs of individual groups of students based on their interactions at various levels. They are also trained to learn to modify their instructional strategies and plans according to the need of the student group in the course of their teaching practice internship.

Introduction to the Open and Distance Learning paradigm for these pre-service level teachers is possible only when these teachers have had some interaction with school students belonging to various age-groups. During this orientation to the ODL paradigm it is important the following aspects be highlighted (especially with reference to the Indian Education System)

1. The ODL System of education aims to remove the barriers to education;
2. The ODL System of education increases educational access and choice;
3. The ODL System of education can help the Indian Government take positive steps towards implementation of the Right to Education Bill. A bill that ensures that the Government of India provides free and compulsory education to children between 6 and 14yrs of age and that these children receive education (a) of equitable quality, and (b) conforming to values enshrined in the Indian Constitution;
4. The ODL System of Education can be used for vocational courses also;
5. The ODL System of Education though provides the freedom to learn at the learner's convenience it is also a systematic approach to acquiring recognized certificates, diplomas and degrees.
6. Technology especially in the form of Computers and Internet can help further strengthen the ODL cause of learning

Stage 2: Instructional Design

Instructional design is usually perceived as a prescriptive discipline (Aronson and Briggs, 1983; Landa, 1983; Arger, 1989; Finkel, 1989; Gupta, 1989; Merrill, 1991; Nation and Walker, 1993). Reigeluth's description of instructional design as 'the process of deciding what methods of instruction are best for bringing about desired change in student knowledge and skills for a specific course content and a specific student population' (Reigeluth, 1983) is a representative one.

Lee, Driscoll, & Nelson (2004) conducted a meta-analysis of research topics of the four most influential distance education research journals for the years 1997 to 2002. They reported a large number of keywords relating implicitly to 'instructional design.' Twenty-seven percent of the articles focused on 'design topics', 'needs assessment,' 'course scheduling,' 'course design,' 'instructional strategy development,' 'course material design,' or 'visual design.'

Instructional Design in the ODL context, helps the material developer answer the following questions about the learner profile (from: Training Educators to Design and Develop ODL Materials A Facilitator's Guide published by COL, 2008):

a) Who are my learners? → Learner Profile
b) What are their needs? → Goals and Objectives
c) What tools do I need? → Content
d) How can I solve their needs? → Strategy
e) Is the strategy working or should I change it? → Evaluation and Revision

Stage 3: Content Delivery through Technology

What instructional designers need to remember is that the integration of technology in learning needs to enhance teaching and learning, rather than just being used as a new flexible delivery medium (Nichols, 2003). Distance education today has come to be known by many names: technology enhanced learning being one of them. After the Instructional Design Stage, Content Delivery through Technology needs to be decided upon. Here the following aspects need to be considered (many of them would also have been considered during Instructional Design):

a) Is the ODL material to be delivered via a CD-ROM or via the Internet? (A very important question as it would be the deciding factor for inclusion of media rich content, like, movies, educational games etc)
b) What is the minimum hardware requirement expected?
c) Would the Technology Enhanced ODL material be Multimedia based or not?
d) Would the Technology Enhanced ODL material be static or dynamic in terms of providing feedback? (Ausubel and Robinson, 1971, stated the feedback is most effective when it is continuous, immediate, full and explained.)
e) What is the expertise level of the Pre-service teacher vis-à-vis technology proficiency?

Stage 4: Evaluation

The evaluation stage judges the effectiveness of the material developed and provides feedback to the Material developers. Evaluation could be formative (throughout the course) or summative (conducted at the end of the course).

OVERVIEW OF TEACHER EDUCATION CURRICULUM AT ARMY INSTITUTE OF EDUCATION, DELHI CANTT.

The teacher education curriculum at the Army Institute of Education, Delhi Cantt. follows the syllabus guidelines of the Guru Gobind Singh Indraprastha University, New Delhi. The curriculum has five foundation courses dealing with areas from the Philosophy and Sociology of Education in India, Psychology of the Learner, Systems and Issues in Indian Education, Curriculum and Instruction and Computers in Education. These five core papers are compulsory. It has also has four papers (two theory and two practicum) dealing with two methodology subjects of the Pre-service teacher. The curriculum also includes Computer practical, wherein the Pre-service teachers gain expertise in developing Story boards for Presentations and developing Online Question Banks. The course duration is of nearly a year, but the Pre-service teachers begin to get familiar with the curriculum transaction process by the time they complete 6 months in the Institute.

At the time of beginning of this project, the Pre-service teachers were capable of the following tasks:

- ✓ Writing Learning Objectives
- ✓ Chunking and Sequencing Content for delivery in the Class
- ✓ Making presentations
- ✓ Using Hot Potatoes ™ to make question banks
- ✓ Understanding learner's profile
- ✓ Develop lesson plans to conduct lessons on specific content areas
- ✓ Design activities to enhance the teaching learning process in the classroom
- ✓ Develop tests to evaluate the lessons taught

LEARNING EXPERIENCES OF THE PRE-SERVICE TEACHERS VIS-À-VIS BACHELOR'S OF EDUCATION AND ODL MATERIAL DEVELOPMENT

The present study followed the experiences of four Pre-service female teachers (one with a Master's Degree in Zoology and the other three with Bachelor's Degree in Zoology). These teachers were volunteers from the group of 40 Science teachers. The decision to choose a Science subject for this project was deliberate, as many of the Pre-service teachers who were training to be English or Social Science Teachers did not have a formal Bachelor's Degree or Master's Degree but were allocated English or Social Science based on their XII grades (a University guideline to ensure that each Pre-service teacher is able to get two methodological options)

Table 1: Schematic Representation of Curriculum Transaction Process at AIE, Delhi Cantt.; Stages of Technology Enhanced ODL Material Development and Learning Experiences of four Pre-service Teachers

Month of the Year	**Curriculum Transaction Process at Army Institute of Education, Delhi Cantt**	**Stages of Technology Enhanced ODL Material Development**	**Learning Experiences (as gathered during interviews and written journals)**
August	Orientation cum Induction Program to the various aspects of the Teacher Education Program		*"…Subjects of the Teacher Education Program were very different from what we had learnt in the college during our Graduation and Post-graduation. I never knew, I would also need to know about Philosophy of Education when I taught in the class…."*
September	Orientation and commencement of Teaching Practice Internship Program		*" ….I had been taking tuitions at home since I was in my XIIth standard. I never faced any difficulty in teaching small groups, but for my classes, I now need to prepare more in terms of Instructional Aid and Worksheets. I also have to be cautious of my Blackboard work and Class discipline. Teaching a particular topic in Biology or Chemistry is very*

			easy, but I had a lot of difficulty when I began writing Objectives for my Lesson Plans. Now after nearly making 15 lesson plans, I can write objectives easily and have learnt to use these objectives as teaching points while delivering my lesson…."
October	Introduction to (a) Storyboards for making Effective Presentations and (b) Instructional Design Concepts		*"….I was very familiar with Powerpoint and had no difficulty in making presentations. But when I had to plan a Presentation on a topic that I was teaching in class, I almost made a lesson plan instead of the Storyboard. The storyboard was a very tedious and time consuming exercise, but I never realized that the overall content delivery would be more effective because of this exercise….."* *" ….I was new to Computers and learnt to make Presentations for the first time during this course. Storyboards helped me organize my content and save time while deciding what to put on screen…."*
November-January	Teaching Practice Internship		*" …A very interesting period, just wish did not have to make so many lesson plans for my classes…."*
February	Introduction to Hot Potatoes	Orientation to the ODL Paradigm of Learning	*"…After the National Seminar on Right to Education, held in our college, I was wondering how all children would be able to go to school? Would'nt there be problems for those children who had to take care of their families also? The short Orientation to ODL did help me realize that incase this process is put in place, many children would be able to gain access to education…."* *"….I feel that although the Orientation to ODL paradigm was interesting, I am not sure how it would be useful in the school system. Yes, for students who don't have access to teachers in general it would be useful, but am not sure is that ODL?...."*
March	Completion of Theoretical Syllabus of B.Ed.	Overview of Instructional Design and in depth Content Analysis of the topic on which the material was being developed.	*"Initially we decided to choose the topic on Meiosis, but felt that an overview of the Cell Structure would be required. Since this was our first attempt we decided to keep the topic that was relatively easy for us"* *"We decided to first do the Content Analysis of the Cell Structure separately, but when we compared our rough work, we felt it wasn't adequate, hence we decided to work in groups. The result was that we were able to do a detailed content analysis and had nearly 10 slides per organelle."*
April- May	Completion of Theoretical Syllabus of B.Ed. and beginning of	Adapting the Content to a Technology Rich	*""…Making the story board after the content analysis was a very difficult task, and we had to ensure that we gave all*

	Practical examinations	Environment and Evaluation	*the concepts yet did not make the learning very boring but interactive…."* *"…We used flow charts, diagrams, pictures wherever possible to make the concepts self explanatory. We also ensured that the language was easy. We wanted to give a glossary of terms also, but there was difficulty in making it, so we decided to leave it…."* *"….There was a big debate amongst us, as how to check the learning objectives. We had decided to use Hot Potatoes, as it was an easy software and we were able to give immediate feedback for the questions. Also we could use a timer to make the questions interesting. We also used images… Two of us wanted that that questions should follow the organelles, but the other two felt that all questions should come in the end, as students would be able to make guesses to answers if the question dealt with a particular concept and was asked immediately….so both of us agreed that all questions should follow after the concepts were covered…."* *"…We used hyperlinks in between our presentation to make small quizzes. It was something, I had not tried while making my own presentation in college. It was neat…"* *"….Our final work consisted of a Presentation with some narration and Questions that gave feedback and kept scores…"* *"…Initially I thought this would be a tough exercise, but as we began working in our group, I realized what all I had learnt in the last 8 months was being practically utilized in this project…if given an opportunity I would like to make more such modules…."*

REACTION OF STUDENTS AND TEACHERS TOWARDS THE TECHNOLOGY ENHANCED ODL MATERIAL DEVELOPED BY PRE-SERVICE TEACHERS

As the material developed by the Pre-service teachers was completed after the schools had shutdown for their summer vacation (10th May 2010) the developed material was shown to students on their return to school. The material was developed for Class XI Biology students and by the time, this material was given to them, many of them had completed the requisite syllabus in their Coaching Classes. Hence, the test for effectiveness of the material was ruled out, instead the students were given a questionnaire to fill. The sample consisted of 18 girls and 12 boys belonging to various English Medium – CBSE Affiliated schools of Delhi Cantt. The analysis of the questionnaire revealed the following aspects:

a) Majority of the students felt that the questions were related to the presentation
b) They felt that most of the questions were very easy and tougher questions could have also been added.
c) 50% of the students had no difficulty in opening the Technology Enhanced Material that was given to them, while the rest after some initial problems were able to access the material

d) All the students enjoyed getting immediate feedback for their answers. One student wrote, "*it made me more careful of what I was choosing because I realized that there was negative marking being done by the computer…"*
e) Some students felt that it became very boring answering so many multiple choice questions, fill in the blanks and true or false questions. They felt that, " *all these questions could have been mixed, instead of giving one type only…"*
f) The pictures used in the Presentation and in the questions were interesting, according to most students. Although two of the students felt that more variety could have been used.

PRE-SERVICE TEACHERS AS ODL MATERIAL DEVELOPERS FOR SCHOOL EDUCATION: NEED AND POSSIBILITIES

As stated earlier, with the Introduction of the Right to Education Bill, the constraint on the Schools and the Government has increased. The teachers in the schools are already hard pressed for time, and expecting them to be fully involved in the process of ODL material development would be taking them to task for their expertise. Instead, Pre-service teachers can work in groups with regular school teachers and teacher educators to be involved in developing ODL Material that would help school children. Today using a computer or a cell phone is not very difficult. These are two very powerful technological mediums that can help school children in the process of their education.

Pre-service teachers with their dual skill sets of ODL Material Development and ability to conduct face-to-face classrooms would also be an asset to cater to the local curricular needs of the students. An idea emphasized in the National Curriculum Framework (2005). Teachers have the potential to be actively involved from developing materials as seen in this intervention to conceptualizing a mass movement, so that quality materials are produced at a local level, that cater to the local needs of the students. They, thus, can become the agents of in the curricular process, as they would be actively involved in planning the curriculum. This autonomy will lead to quality school education, as all stakeholders, like, teachers, parents (linked via the teachers), students (again linked via the teachers and pre-service teachers), teacher educators and policy makers (linked via teacher educators) would work towards ensuring the teaching learning process is constructive, collaborative and meaningful.

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